Chandra Study of Young Stellar Objects in the NGC 1333 Star-forming Cloud

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Abstract

NGC 1333 is a reflection nebula surrounded by a double cluster of approximately 150 low- and intermediate-mass young stars with mean absorption $A_v = 7$. About half have IR excesses from circumstellar disks, the other half are presumably weak-line T-Tauri stars. These stars have produced an astonishing profusion of outflows with at least 17 YSOs producing Herbig-Haro objects, H2 shocks and/or CO flows. The kinetic energy of these outflows dominates the dynamics of the cloud. The large population of short-lived outflows, together with the K luminosity function, indicates that the cluster is extremely young with a star formation rate around 1×10^{-4} stars/yr over the past 1-2 Myr. The population includes several far-IR YSOs including at least two Class 0 protostars.

We present the first high-spatial-resolution X-ray images of NGC 1333 obtained in a 39-ksec observation with the Advanced CCD Imaging Spectrometer aboard the Chandra X-ray Observatory in July 2000. The field is resolved at the arcsecond level into about 100 sources, including all sources seen by ROSAT. Most are T Tauri stars but several protostars are present. We also find evidence for extended emission around LkHα 270.

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